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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/534,851	05/13/2005	Gad Assaf	05-24	3627
34704 7590 08/06/2007 BACHMAN & LAPOINTE, P.C. 900 CHAPEL STREET SUITE 1201 NEW HAVEN, CT 06510			EXAMINER GEOGHEGAN, CHRISTOPHER D	
			ART UNIT	PAPER NUMBER
			3744	
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			08/06/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/534,851

Applicant(s)

ASSAF, GAD

Examiner

Christopher D. Geoghegan

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 May 2005.
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-23 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 13 May 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 5/13/2005.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described, in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-8, 10, 11 and 16-22 are rejected under 35 U.S.C. 102(b) as being anticipated by Assaf (US 6,018,954).

- Regarding claim 1, Assaf anticipates the limitation of “first and second liquid/air heat exchangers” by disclosing a heat pump system and method for air conditioning wherein the heat pump system (2) has two substantially similar units (4) and (6), each acting in its turn as an evaporator and a condenser [column 3, lines 20-22]. Also, Assaf discloses a blower (20) that introduces outside air into the housing (8) of the outside liquid/air heat exchanger (henceforth referred to as “first heat exchanger”) to exchange heat with the liquid brine before the air enters the enclosure; and a blower (20') that introduces room air into the housing (8') of the inside liquid/air heat exchanger (henceforth referred to as “second heat exchanger”) to exchange heat with the liquid brine before the air is returned to the outside ambient air [column 3, lines 25-29; Note: the second blower (20) is mislabeled as (21') in this reference. The reference numerals (21) and (21') are not used in the

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remainder of the disclosure, and from the Figures it can be inferred that the correct label for the blower of the second heat exchanger is (20')].

- Regarding claim 2, Assaf anticipates the limitation of "further comprising a heat pump, said first and second heat exchangers being in fluid communication with each other through said heat pump" [column 1, lines 34-44].
- Regarding claim 3, Assaf discloses that each of the first and second heat exchangers comprises: "a housing (8, 8') having a liquid reservoir (14, 14') at its lower section and an evaporative media (12, 12') at its upper section"; "a dripping chamber (16, 16') between said reservoir (14, 14') and said evaporative media (12, 12')"; "liquid outlets (10, 10') disposed above said media (12, 12')"; "means (20, 20') for forcing air to enter said housing (8, 8') and form a counter-flow relative to the liquid flow exiting from said liquid outlets (10, 10')", and "means (28, 28') for propelling brine from said reservoir (14, 14') to said liquid outlets (10, 10')" [column 2, lines 20-44; column 3, lines 25-30].
- Regarding claim 4, Assaf anticipates the limitation of "wherein said heat pump comprises: an evaporator; a condenser, and a refrigerant compressor and an expansion valve interconnecting said evaporator and said condenser" [column 2, lines 45-50; Fig. 1, coils (38, 38'), compressor (44), expansion valve (46)].
- Regarding claim 5, Assaf anticipates the limitation of "wherein said heat pump further comprises means for reversing the flow of said refrigerant" [column 1, lines 43-44; column 4, lines 18-22].

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- Regarding claim 6, Assaf anticipates the limitation of "further comprising conduit means directly interconnecting said reservoirs" [column 2, lines 41-44; Fig. 1, (30), (32)].
- Regarding claim 7, Assaf anticipates the limitation of "wherein each of said reservoirs is in fluid communication with said heat pump via pump means" [column 2, lines 38-44].
- Regarding claim 8, Assaf anticipates the limitation of "wherein the outlet from said evaporator is in fluid communication with the liquid outlets of said second heat exchanger and the reservoir of said second heat exchanger is in fluid communication with the liquid outlets of said first heat exchanger" [column 1, lines 34-44, showing that the components of the heat pump system are in closed-loop, fluid communication with each other].
- Regarding claims 10 and 11, Assaf discloses that the heat exchangers (24, 24') are in fluid communication with one another [column 1, lines 34-44], each acting in turn as an evaporator and a condenser [column 2, lines 20-24]. The reservoirs (14, 14') are in fluid communication with each of the heat exchangers (12, 12') [Fig. 1, reservoirs (14, 14') in fluid communication with heat exchangers (12, 12') via spaces (16, 16')].
- Regarding claim 16, Assaf anticipates the limitation of "wherein said liquid is a liquid desiccant" [column 3, lines 25-29, illustrating the use of brine, which is a liquid desiccant].

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- Regarding claim 17, Assaf anticipates the limitation of “wherein said liquid is brine” [column 3, lines 25-29].
- Regarding claim 18, Assaf provides an air-conditioning system as claimed in claim 1 [see 35 U.S.C. 102(b) rejection to claim 1 above]. Assaf anticipates the limitation of “precooling said liquid prior to entering same into the evaporator by utilizing cooled air from said space” [column 3, lines 25-35].
- Regarding claim 19, Assaf provides an air-conditioning system as claimed in claim 4 [see 35 U.S.C. 102(b) rejection to claims 1, 2 and 4 above]. Assaf also discloses the preferred utilization of a third heat exchanger (34), which is part of the heat pump system, “for preconditioning the liquid passing therethrough before propelling the liquid through said heat exchangers” [column 2, lines 42-44; Fig. 1, heat exchanger (34) preconditioning the brine through conduits (30) and (32) before entering heat exchangers (8', 8)].
- Regarding claims 20 and 21, Assaf anticipates the limitations, “extracting heat from said condenser by cooling liquid passing therethrough with cooled air” and “preheating liquid in said condenser by exchanging heat between liquid and heated air” [column 3, lines 25-35].
- Regarding claim 22, Assaf anticipates the limitation of “heating the evaporator by liquid heated by exchanging heat between said liquid and heated air” [column 3, lines 25-35].

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Assaf in view of Takahashi et al. (Takahashi, US 5,052,472). Assaf discloses compressor means for reversing the flow of the refrigerant, causing the heat pump system (2) to operate units (4) and (6) alternately as an evaporator and a condenser, respectively [column 2, lines 20-24; column 4, lines 19-22]. Assaf fails to teach "a multi-way valve operationally connected between said reservoirs and said heat pump." Takahashi teaches that a second heat exchanger which has been connected to the discharge side of a compressor can be connected to the suction side of the compressor, and the first heat exchanger which has been connected to the suction side of the compressor can be brought into connection with the discharge side of the compressor, simply by operating a four-way valve [column 4, lines 26-59]. Thus, switching between the heat pump cycle

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and the refrigeration cycle can be done in a short time simply by switching the position of the four-way valve (50) [column 4, lines 22-25]. One of ordinary skill in the art at the time the invention was made would understand that the use of a multi-way valve connected between the reservoirs and the heat pump would be an obvious engineering expedient for reversing the flow of refrigerant through the heat pump system and thus for switching the operation of the units (4) and (6). It would have been obvious to one skilled in the art at the time the invention was made to modify the heat pump system of Assaf to include a multi-way valve in order to switch the direction of refrigerant flow within the system, as taught by Takahashi, so that the system may be switched from a cooling operation to a heating operation, and vice versa.

6. Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Assaf in view of Griffiths et al. (Griffiths, US 3,712,026).

- Regarding claim 12, Assaf fails to teach the limitation of "wherein said means for forcing air into said housing is a fan located above said liquid outlets." Griffiths discloses an enthalpy exchange system wherein air is drawn into an intake tower (11) by way of a fan (22) located above the spray nozzles (18) [column 3, lines 16-27; Fig. 1]. Griffiths also discloses an exhaust tower (24) that receives air by way of a fan (25) that is located at the intake end of the tower (24) [column 3, lines 29-36; Fig. 1]. Though Griffiths depicts the fan (25) at the intake side of the tower (24) rather than at the outlet side, Griffiths teaches that locating the fans at either the inlet or exit of the towers does not affect the enthalpy exchange efficiency of the system

[column 4, lines 14-17], and therefore either location is an obvious engineering design expedient. It would have been obvious to one skilled in the art at the time the invention was made to modify the heat pump system of Assaf so that the fans (20, 20') were located above the liquid outlets (10, 10'), as taught by Griffiths, in order to provide air circulation through the heat exchangers (12, 12').

- Regarding claim 13, Assaf fails to teach the limitation of "further comprising a drift eliminator located between said liquid outlets and said fan." Griffiths teaches the use of spray eliminators (19) and (33) between the liquid outlets (18) and (32), and the outlets (21) and (34) of the towers (11) and (24). Furthermore, Griffiths discloses that the spray eliminator (19) is located between the liquid outlet (18) and fan (22) [column 3, lines 16-37]. Given the teaching of Griffiths regarding the placement of fan (25) as set forth in the 35 U.S.C. 103(a) rejection to claim 12 above, the placement of fan (25) being similar to that of fan (22), the spray eliminator (33) would be located between the liquid outlet (32) and fan (25). It would have been obvious to one skilled in the art at the time the invention was made to modify the fan arrangement of Assaf as taught by Griffiths in order to circulate air throughout the system. It would have been obvious to one skilled in the art at the time the invention was made to utilize spray eliminators, such as those used by Griffiths, after the spray nozzles and before the air outlets in order to eliminate any carry-over of entrained droplets of hygroscopic solution in the air exiting from the intake and exhaust air towers [column 3, lines 46-50].

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7. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Assaf in view of Peterson et al. (Peterson, US 4,941,324). Assaf fails to teach the limitation of "further comprising a humidifier disposed in the passageway leading from said first heat exchanger to said enclosure." Peterson, however, discloses the use of a humidifier (52) configured within the evaporator flow path to add moisture to the air delivered to the conditioned space [column 5, line 67 - column 6, line 6]. It would have been obvious to one skilled in the art at the time the invention was made to add a humidifier within the flow path of the evaporator of Assaf, as taught by Peterson, for the purpose of further reducing the temperature of air supplied to the conditioned space by adding moisture to the air.

8. Claims 15 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Assaf in view of Chu et al. (Chu, US 2002/0116933 A1).

- Regarding claim 15, Assaf teaches the limitation "wherein one of said reservoirs further comprises an inlet port for adding liquid to replenish evaporation" [column 3, lines 6-10; Fig. 3, (56)], but fails to explicitly teach that "a second of said reservoirs comprises an outlet port for draining excess liquid." Chu teaches that in a recuperative environmental conditioning unit, water vapor condenses on the cold surfaces of the normally cold heat exchanger (164). Condensate accumulates on the heat exchanger (164) and eventually falls into a collection area until it is removed. One skilled in the art would recognize that in the invention of Assaf, condensate would accumulate on the heat exchanger (12) and eventually fall and

accumulate in reservoir (14). Chu continues to disclose a mechanism, such as a valve, to remove condensate from the collection area. It would have been obvious to one skilled in the art at the time the invention was made to include an outlet port in the reservoir (14) to remove excess condensate, as taught by Chu, from the heat pump system of Assaf for subsequent disposal of the condensate [¶0061], thereby preventing a breakdown in the operation of the system.

- Regarding claim 23, Assaf and Chu provide a system as claimed in claim 15 [see 35 U.S.C. 103(a) rejection to claim 15 above]. The method of “replenishing the reservoir of the heat exchanger receiving fresh air from the environment with liquid desiccant” (e.g. salt water, otherwise known as brine) directly follows from the system as claimed in claim 15, as it would have been obvious to one skilled in the art at the time the invention was made to replenish a tank containing salt water with additional salt water when needed, via the inlet port (56). Once again, the method of “draining excess water from the reservoir of the other heat exchanger” directly follows from the use of the system as claimed in claim 15, as it would have been obvious to one skilled in the art at the time the invention was made to drain the condensate from the reservoir of the other heat exchanger in order to prevent a condensate leak.

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher D. Geoghegan whose telephone number is

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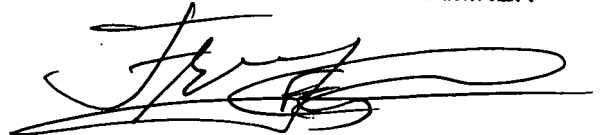
571-270-1993. The examiner can normally be reached on Monday - Thursday, 8:00-4:30 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frantz Jules can be reached on 571-272-6681. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

CDG 7/31/2007

FRANTZ JULES
SUPERVISORY PATENT EXAMINER

A handwritten signature in black ink, appearing to read 'Frantz', with a long horizontal flourish extending to the right.